

**CLAIMS :**

1. A method in a data processing system for managing cached data, the method comprising:

responsive to initiating a write operation on the data block, sending a message to all other data processing systems identified in the directory of data blocks as containing a copy of the data block to reset the flag such that the flag indicates that the data in the data block is invalid without requiring any action by the other data processing systems receiving the message.

3. The method of claim 1, wherein the data block is a page.

4. A method in a data processing system for managing a plurality of caches of data, wherein the data processing system includes a plurality of processors, the method comprising:

dedicating a processor within the plurality of processors for polling for request messages from other data processing systems;

responsive to initiating a write operation on the data block, sending a message to all of the other data processing systems that the data block is invalid.

6. The method of claim 4 further comprising:  
providing a lock table, wherein the lock table  
20 contains data identifying the data processing system and  
a location of a validity flag in which the validity flag  
indicates whether the data block is valid.

25 8. The method of claim 4, wherein the message initiates  
an invalidation of the data block.

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9. A method in a data processing system for managing data in a distributed buffer system, the method comprising:

- identifying an operation to access the data;
- 5 determining whether a copy of the data is present locally within the data processing system;
- responsive to the copy of the data being present locally within the data processing system, checking an indicator for the data to determine whether the copy of
- 10 the data is valid; and
- responsive to the data being valid, accessing the copy of the data.

10. The method of claim 9 further comprising:

- 15 responsive to an absence of a copy of the data being present locally within the data processing system, copying the data into the data processing system; and
- setting an indicator to indicate that the data copied into the data processing system is valid.

20 11. The method of claim 9 further comprising:

- responsive to the accessing being a write access, obtaining identification of all nodes having containing the data to form a set of identified nodes; and
- setting indicators in the set of identified nodes to
- 25 indicate that the data is invalid in the set of identified nodes.

12. The method of claim 11, wherein the set of nodes is a set of data processing systems.

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13. The method of claim 9, wherein the data processing system includes a plurality of processors and wherein the method is a set of instructions executed by one of the plurality of processors.

5 14. The method of claim 9, wherein the data is a page.

15. The method of claim 9, wherein the operation is read operation.

16. The method of claim 9, wherein the operation is a write operation.

10 17. A data processing system comprising:  
a bus system;  
a communications unit connected to the bus system;  
a memory connected to the bus system, wherein the  
memory includes a set of instructions; and  
15 a processing unit connected to the bus system,  
wherein the processing unit executes the set of  
instructions to, place an indication on a directory of  
data blocks identifying the data processing system as  
containing a copy of a data block with a location in the  
20 data processing system in which a flag associated the  
data block is located in response to initiating a read  
operation on the block of data; and send a message to all  
other data processing systems identified in the directory  
of data blocks as containing a copy of the data block to  
25 reset the flag such that the flag indicates that the data  
in the data block is invalid without requiring any action

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by the other data processing systems receiving the message in response to initiating a write operation on the data block.

18. A data processing system comprising:

- 5       a bus system;  
      a communications unit connected to the bus system;  
      a memory connected to the bus system, wherein the memory includes a set of instructions; and  
      a processing unit connected to the bus system,  
10   wherein the processing unit executes the set of instructions to dedicate a processor within the plurality of processors for polling for request messages from other data processing systems; post an indication on a directory of data blocks identifying the read operation  
15   by the data processing system in response to initiating a read operation to read data on a data block; and send a message to all of the other data processing systems that the data block is invalid to remove the data block from the directory of data blocks in response to initiating a  
20   write operation on the data block.

19. A data processing system comprising:

- a bus system;  
      a communications unit connected to the bus system;  
      a memory connected to the bus system, wherein the  
25   memory includes a set of instructions; and  
      a processing unit connected to the bus system,  
      wherein the processing unit executes the set of instructions to identify an operation to access the data; determine whether a copy of the data is present locally  
30   within the data processing system; check an indicator for

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the data to determine whether the copy of the data is valid in response to the copy of the data being present locally within the data processing system; and access the copy of the data in response to the data being valid.

- 5 20. A data processing system for managing cached data, the data processing system comprising:

placing means, responsive to initiating a read operation on a block of data, for placing an indication on a directory of data blocks identifying the data processing system as containing a copy of the data block  
10 with a location in the data processing system in which a flag associated the data block is located; and  
sending means, responsive to initiating a write operation on the data block, for sending a message to all  
15 other data processing systems identified in the directory of data blocks as containing a copy of the data block to reset the flag such that the flag indicates that the data in the data block is invalid without requiring any action by the other data processing systems receiving the  
20 message.

21. The data processing system of claim 20, wherein the directory of data blocks is located in at least one of the data processing system and the other data processing systems.

- 25 22. The data processing system of claim 20, wherein the data block is a page.

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23. A data processing system for managing a plurality of caches of data, wherein the data processing system includes a plurality of processors, the data processing system comprising:

5       dedicating means for dedicating a processor within the plurality of processors for polling for request messages from other data processing systems;

          posting means, responsive to initiating a read operation to read data on a data block, for posting an  
10       indication on a directory of data blocks identifying the read operation by the data processing system; and

          sending means, responsive to initiating a write operation on the data block, for sending a message to all  
15       of the other data processing systems that the data block is invalid to remove the data block from the directory of data blocks.

24. The data processing system of claim 23 further comprising:

          obtaining means for obtaining a lock on a data  
20       block;

          determining means for determining whether a copy of the data block is present within a local cache; and

          checking means, responsive to a copy of the data block being absent from the local cache, for checking a  
25       validity of the data block in the buffer.

25. The data processing system of clam 23 further comprising:

          providing means for providing a lock table, wherein the lock table contains data identifying the data  
30       processing system and a location of a validity flag in

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which the validity flag indicates whether the data block is valid.

26. The data processing system of claim 23, wherein the data block is a page.

5 27. The data processing system of claim 23, wherein the message initiates an invalidation of the data block.

28. A data processing system for managing data in a distributed buffer system, the data processing system comprising:

10 identifying means for identifying an operation to access the data;

determining means for determining whether a copy of the data is present locally within the data processing system;

15 checking means, responsive to the copy of the data being present locally within the data processing system, for checking an indicator for the data to determine whether the copy of the data is valid; and

20 accessing means, responsive to the data being valid, for accessing the copy of the data.

29. The data processing system of claim 28 further comprising:

25 copying means, responsive to an absence of a copy of the data being present locally within the data processing system, for copying the data into the data processing system; and



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setting means for setting an indicator to indicate that the data copied into the data processing system is valid.

30. The data processing system of claim 28 further  
5 comprising:

obtaining means, responsive to the accessing being a write access, for obtaining identification of all nodes having containing the data to form a set of identified nodes; and

- 10 setting means for setting indicators in the set of identified nodes to indicate that the data is invalid in the set of identified nodes.

31. The data processing system of claim 30, wherein the set of nodes is a set of data processing systems.

- 15 32. The data processing system of claim 28, wherein the data processing system includes a plurality of processors and wherein the method is a set of instructions executed by one of the plurality of processors.

- 20 33. The data processing system of claim 28, wherein the data is a page.

34. The data processing system of claim 28, wherein the operation is read operation.

35. The data processing system of claim 28, wherein the operation is a write operation.

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36. A computer program product in a computer readable medium for managing a plurality of caches data, the computer program product comprising:

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the plurality of processors for polling for request messages from other data processing systems;

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is invalid to remove the data block from the directory of data blocks.

5 the computer program product comprising:

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        second instructions for determining whether a copy
of the data is present locally within the data processing
10  system;

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15        fourth instructions, responsive to the data being  
valid, for accessing the copy of the data.